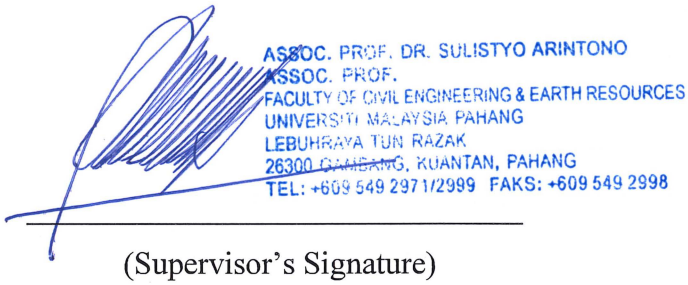
SUPERVISOR'S DECLARATION

I hereby declare that I have checked this thesis and in my opinion, this thesis is adequate in terms of scope and quality for the award of the degree of the Bachelor Degree of Civil Engineering



(Supervisor's Signature)

Full Name : PROFFESOR MADYA SULISTYO ARINTONO

Position : LECTURER

Date : 19 JUNE 2017

STUDENT'S DECLARATION

I hereby declare that the work in this thesis is based on my original work except for quotations and citations which have been duly acknowledged. I also declare that it has not been previously or concurrently submitted for any other degree at University Malaysia Pahang or any other institutions.

(Student's Signature)

Full Name : NURUL FAJRINA HAZIRAH BINTI AZMAN

ID Number : AA 13072

Date : 19 June 2017

SAFETY MEASURES AT RURAL STOP CONTROLLED INTERSECTION IN UMP GAMBANG

NURUL FAJRINA HAZIRAH BINTI AZMAN

Thesis submitted in fulfillment of the requirements
for the award of the
Bachelor Degree in Civil Engineering

Faculty of Civil Engineering and Earth Resources

UNIVERSITI MALAYSIA PAHANG

JUNE 2017

ACKNOWLEDGEMENTS

Alhamdulillah, praise to Allah S.W.T and the Holy Prophet Muhammad S.A.W. with His blessing, I can finish my Final Year Project.

I am grateful and would like to express my sincere gratitude to my supervisor Dr. Professor Madya Dr. Sulistyo Arintono from Faculty of Civil Engineering and Earth Resources, for her/his germinal ideas, invaluable guidance, continuous encouragement and constant support in making this research possible. Special thanks to Bahagian Keselamatan UMP which cooperate with me by providing me accident data which without their cooperation I may not complete my research.

I acknowledge my sincere indebtedness and gratitude to my parents for their love, dream and sacrifice throughout my life. I am also grateful to my friend, Nuramalina Binti Fauzi and Nurul Jannatul 'Atiqah Binti Othman for understanding that were inevitable to make this work possible. I cannot find the appropriate words that could properly describe my appreciation for their devotion, support and faith in my ability to attain my goals. Special thanks should be given to my committee members. I would like to acknowledge their comments and suggestions, which was crucial for the successful completion of this study.

ABSTRAK

Projek ini merupakan penyelidikan keselamatan di luar bandar dikawal persimpangannya di UMP Gambang. Kajian kes telah dijalankan di jalan utama yang terletak menuju ke Kolej Kediaman 2 dan Kolej Kediaman 4 dari jalan pintu masuk UMP atau dari lebuh raya. Tanda lalu lintas dan menandakan data telah dikumpulkan daripada pemerhatian manakala data reka bentuk geometri dikumpulkan daripada pemerhatian. Maklumat mengenai data kemalangan dikumpulkan dari Bahagian Keselamatan UMP dan data jumlah trafik dikumpulkan daripada kajian. Tinjauan ke atas jumlah trafik telah dijalankan selama 1 hari pada waktu puncak iaitu pada waktu pagi dan petang selama 1 jam. penyiasatan ini termasuklah pelbagai mod pengangkutan seperti kereta, motosikal, bas dan lain-lain yang lulus jalan raya mengikut kelas mereka semasa musim panas. tahap keselamatan akan dinilai mengikut waran. Dari kajian yang telah dilakukan, bilangan kemalangan meningkat kerana jumlah peningkatan pengangkutan. Kebanyakan pelajar UMP mempunyai kereta dan motosikal faktor yang menyumbang kepada fenomena ini adalah trafik penandaan pudar, dan tingkah laku manusia. Ini kerana jalan menyediakan kekeliruan simpang kelihatan lurus pada setiap setiap jalan. Beberapa pengguna jalan raya tidak tahu jalan mana keutamaan manakala yang lain hanya tidak mengikut peraturan. Selain itu, ada tanda lalu lintas yang tidak mengikuti piawaian. Ini boleh membawa pengguna jalan raya mengabaikan tanda dan peraturan. Mereka tidak mengikuti peraturan dan berdasarkan pemerhatian saya, mereka mempercepatkan lebih daripada kelajuan yang dicadangkan dan U-turn di tempat itu U-turn adalah tidak dibenarkan. Keadaan trafik yang menandakan juga tidak baik kerana menandakan sudah pudar. Ini menyediakan kekeliruan kepada pengguna jalan raya sebagai jalan adalah reka bentuk untuk memberi laluan tetapi pengguna jalan raya tidak menyedari menandakan jalan pudar. Kerana terdapat banyak kemalangan yang berlaku di sana, penghadang digunakan untuk mengatasi masalah ini, bagaimanapun, masih terdapat kemalangan berlaku kerana pengguna jalan raya tidak mematuhi undang-undang jalan raya. Berdasarkan data geometri, Ringkasan Faktor-faktor dan Borang Intersection Choice Kawalan tertentu. (Sumber: Keselamatan dan Penilaian Operasi yang dijalankan oleh Alberta Pengangkutan) dirujuk untuk menentukan tahap sesuai persilangan bagi persimpangan ini. Daripada keputusan, bulatan adalah yang paling sesuai untuk persimpangan ini

ABSTRACT

This project is a research about safety measures at rural stop controlled intersection in UMP Gambang. The case study was conducted at the main road that are located heading to Kolej Kediaman 2 and Kolej Kediaman 4 from the entrance road of UMP or from highway. The traffic sign and marking data was collected from observation while geometric design data was collected from observation. The information about accident data was collected from Bahagian Keselamatan UMP and the data of traffic volume was gathered from survey. The survey of traffic volume was conducted for 1 day during peak hour which is in morning and evening for 1 hours. The survey includes various mode of transport such as cars, motorbike, buses and others that passing the road according to their classes during summer. Safety level will be assessed according to the warrants. From the research that had been done, the number of accident increases because volume of transportation increases. Most of UMP students have cars and motorcycles the factor that contribute to this phenomena are traffic marking faded, and human behaviour. This is because the road provide confusion as the junction looks straight at every each of the way. Some of the road user does not know which way is the priority while the others just do not follow the rules. Besides that, some of the traffic sign is not follow the standard. This may lead the road user ignore the sign and rules. They are not following the rules and based on my observation, they speed more than proposed speed and U-turn at place that U-turn is not allowed. The condition of the traffic marking is also not good because the marking is already faded. This provide confusion to the road user as the road is design to give way but the road user does not aware of the faded road marking. As there are many accident happened there, the barricades is used to overcome this problems, however, there are still accident happened because road user do not comply with the laws of the road. Based on the geometric data, Summary of Specific Factors and Form of Intersection Control Choice. (Sources: Safety and Operational Assessments conducted by Alberta Transportation) are referred to determine suitable level of intersection for this intersection. From the results, roundabout is the most suitable for this intersection.

TABLE OF CONTENT

LIST OF TABLES

LIST OF FIGURES

LIST OF ABBREVIATIONS

UMP	University Malaysia Pahang
KK2	Kolej kediaman 2
KK4	Kolej kediaman 4
FHWA	Federal Highway Administration Office of Safety
IIHS	Insurance Institute for Highway Safety

CHAPTER 1

INTRODUCTION

1.1 Introduction

Present level intersections include those which still face safety challenges such as the occurrence of collisions between vehicles crossing on intersecting streets and between a vehicle travelling straight through and a vehicle turning right on the same street. There are also signalized intersections where the traffic volume is low, resulting in the smooth flow of traffic being obstructed because drivers needlessly wait for a signal change when no vehicles are crossing the intersection. To counter these problems, warrants can be applied at a specific location, a comprehensive engineering study must be conducted, including a safety investigation and an evaluation of intersection operational characteristics. (Government of Alberta Transportation, 2004). Interest in this project is because accidents have increased in UMP Gambang Campus. This report introduces the studies of safety measures at rural stop controlled intersection.

1.2 Background

Accidents becoming serious phenomenon nowadays as the volume of vehicle increasing in UMP. The road that are heading to Kolej Kediaman 2 and Kolej Kediaman 4 from the entrance road of UMP or from highway provide a confusion as the junction looks straight at every each of the way. Some of the road user does not know which way is the priority while the others just do not follow the rules. Basically, during peak hours, the volume of the vehicles increased and the risk of accident becomes higher. The accidents also often happened at night as the road is too dark as there is no street lights provided there. The road user may not see the vehicle comes from the other side and

accident happened as the existing junction have many conflict. An investigation should be conducted to determine which level intersection that is suitable to the location.

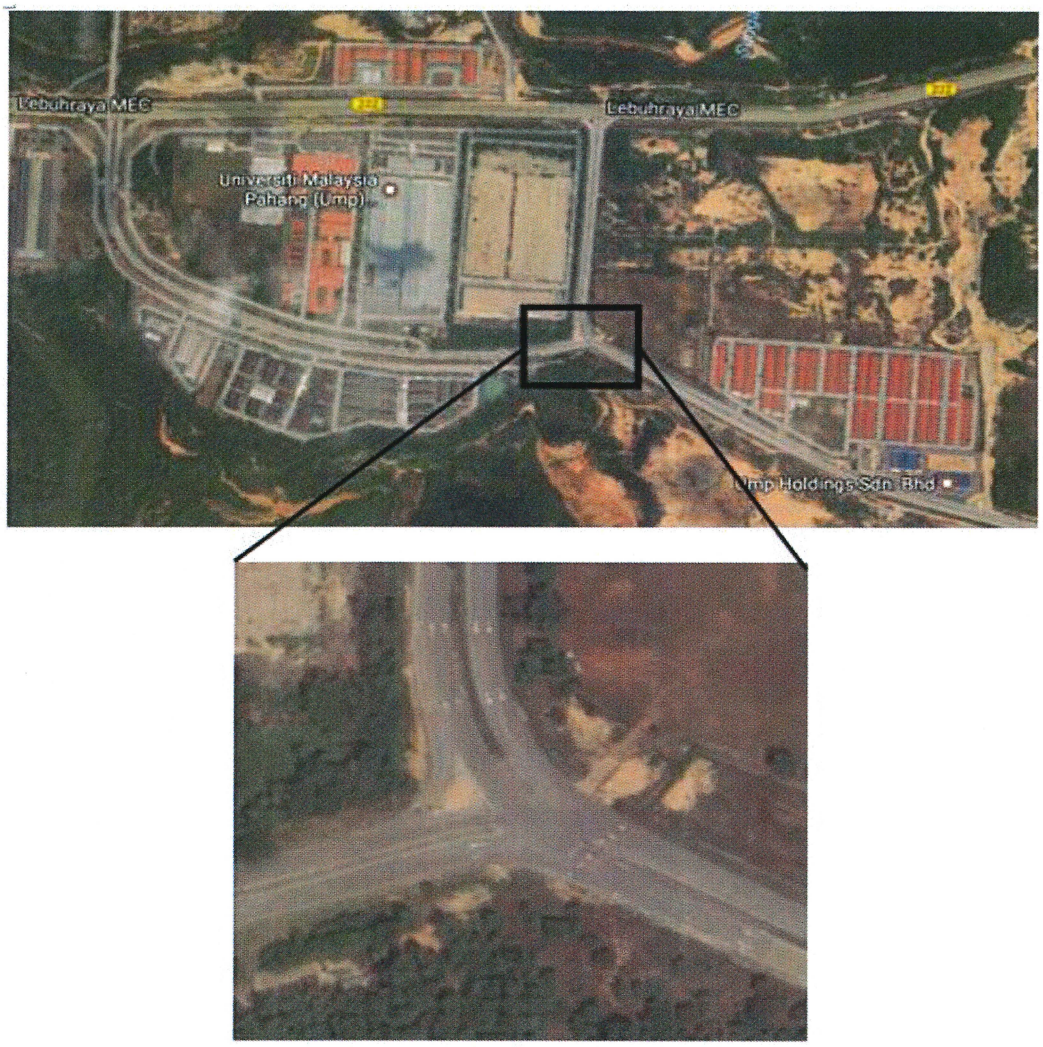


Figure 1.1 Proposed area

Source: Google Maps 2017.

1.3 Problem Statement

The geometry of the existing road lead to the unsmooth traffic flow as the junction provide confusion cause the road user refuse to follow the rules. Drivers have to stop and give the priority to the other vehicle from the other way which can cause delay. This phenomenon getting worst during peak hours which in the morning and evening where staff and students go and back from working and at night as the road is dark. All of this leads to accident to happen.

1.4 Objectives of the Study

The research objectives are:

•To access traffic volume, geometric design, traffic sign and marking and accident data.

•To assess the safety level of this intersection.

1.5 Scope of Study

The case study will be conducted at the main road that are located heading to Kolej Kediaman 2 and Kolej Kediaman 4 from the entrance road of UMP or from highway. The traffic sign and marking data will be collected from observation while geometric design data will be collected from observation. The information about accident data will be collected from Bahagian Keselamatan UMP and the data of traffic volume will be gathered from survey. The survey of traffic volume will be conducted for 1 day during peak hour which is in morning and evening for 1 hours. The survey includes various mode of transport such as cars, motorbike, buses and others that passing the road according to their classes during summer. Safety level will be assessed according to the warrants.

REFERENCES

"Important Factor to Build Roundabout". Washington State Department of Transportation. Retrieved 21 October 2016.

"Characteristic of Roundabout". Federal Highway Administration Office of Safety (FHWA). Retrieved 21 October 2016.

"Safety Concern". American Association of State Highway and Transportation Officials (AASHTO) Safety Manual. Retrieved 30 October 2016.

"Geometry of Roundabout". Federal Highway Administration Office of Safety (FHWA). Retrieved 11 November 2016.

"Factor that Contribute to Reduction of Collision at Roundabout". Insurance Institute for Highway Safety (IIHS). Retrieved 23 November 2016.

"Benefits of Roundabout". Federal Highway Administration Office of Safety (FHWA). Retrieved 23 November 2016.

"Safety Measures at Rural Stop Controlled Intersection". Safety and Operational Assessments conducted by Alberta Transportation.